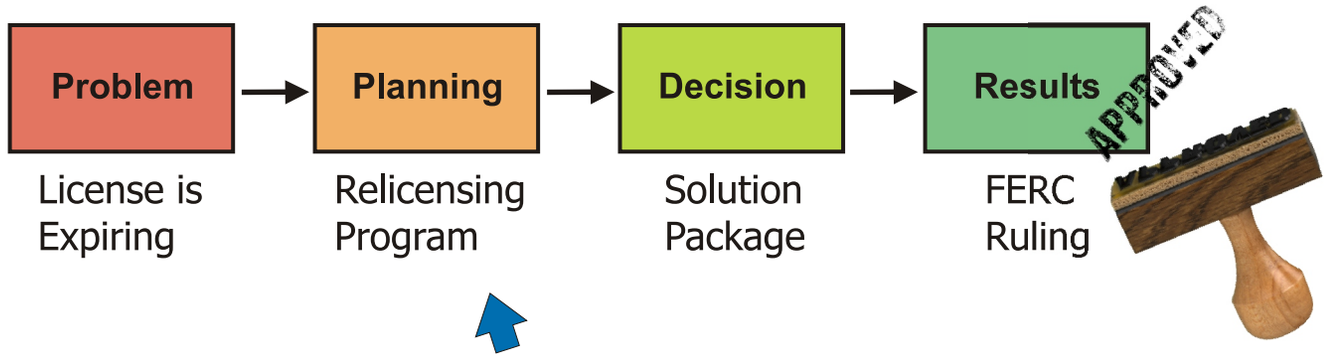
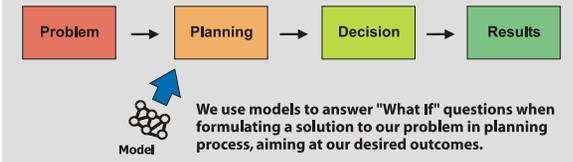
Operations Modeling Support – From Basics to Philosophy



"**Model** – n. A system of postulates, data, and inferences presented as a mathematical description of an entity or state of affairs" (Merriam-Webster's Collegiate Dictionary).



Philosophy of Modeling

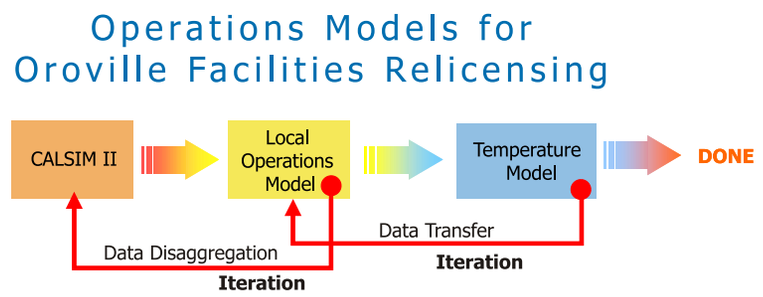
"All models are wrong, but some are useful."
– George Box, Professor, U. of Wisconsin

"Entities should not be multiplied unnecessarily."
– William of Occam, 14th century logician

"Make your theory as simple as possible, but no simpler."
– Albert Einstein

"For every complex question there is a simple and wrong solution."
– Albert Einstein

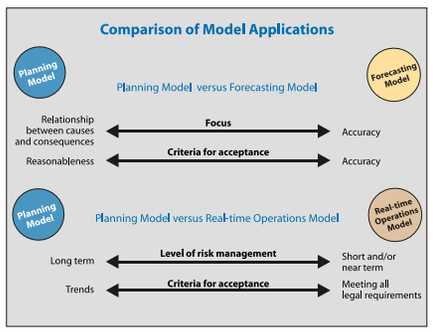
Operations Models for Oroville Facilities Relicensing



Key to Success 1

Matching the Modeling Purposes

- Operations models evaluate benefits and impacts of certain long-term measures.
- The acceptance of the models should be evaluated based on the ability to provide a reasonable display of long-term risks associated with proposed measures.



Key to Success 2

Getting the Right Information

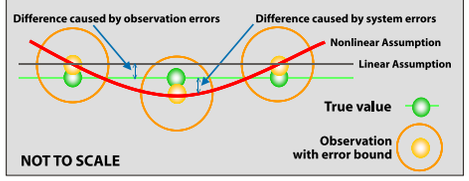
The real world is perfect; the modeling world cannot fully capture its complexity. Our goal is to minimize the impacts of modeling errors on decision making in Oroville Facilities Relicensing by:

- Minimizing potential system errors through reviews for modeling biases
- Focusing on reasonableness and long-term trends for planning purposes
- Inferring from relative changes between scenarios
- Considering significance of relative changes in a real-world sense
- Looking past unsupported model precision

Modeling Errors

- System errors: Assumptions on how the system works
- Observation (measurement) errors: Data used to calibrate the model, built on the above assumptions, for its application

Most of the time, both errors exist!



Key to Success 3

Managing the Modeling Effort

Collaboration among requestors, modeling coordinator, and modeling team members to accommodate more requests in a more effective and efficient manner.

Responsibilities of the modeling coordinator (Curtis Creel, DWR) include:

Prioritizing Among Requests:
Critical to relicensing program by factors including: completeness of the request, physical/legal/policy feasibility of proposed operational changes, work load of modeling team members

Consolidating Requests by:
Finding common ground, using representative conditions.

Modeling Request Process